

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application.

COMPLETE LISTING OF THE CLAIMS:

Claims 1-88 : (Canceled)

Claim 89 : (New) A data communications system, comprising:

- a) a plurality of nodes and a plurality of links for providing connections between the plurality of nodes;
- b) a subset of the plurality of links and the plurality of nodes being operative for forming a worker path for carrying worker data through the communications system;
- c) a further subset of the plurality of links and the plurality of nodes being operative for forming a protection path for carrying non-worker data in the absence of a fault in the worker path, the protection path comprising a plurality of disjoint detours, each detour being operative for providing an alternative path for the worker data in a different part of the worker path in the event of a fault in the worker path; and
- d) protection means, in which the protection path is predetermined by the protection means prior to detection of a fault in the worker path, the protection means being operative for activating the entire plurality of detours to carry the worker data upon detection of a fault in the worker path, and the protection means being further operative for identifying the location of the fault, and for returning the worker data to a part of the worker path not affected by the fault from at least one of the plurality of detours providing an alternative to that part of the worker path

not affected by the fault, while those of the plurality of detours providing an alternative to parts of the worker path which are affected by the fault continue to carry the worker data.

Claim 90 : (New) The system according to claim 89, in which the plurality of nodes of the further subset comprise storage for storing details of the plurality of detours prior to the detection of the fault in the worker path.

Claim 91 : (New) The system according to claim 90, in which the details of the protection path are associated with a unique path identifier.

Claim 92 : (New) The system according to claim 90, in which each of the plurality of nodes of the further subset comprise a protection table for storing the details of the protection path to which it belongs.

Claim 93 : (New) The system according to claim 89, in which at least one of the plurality of nodes common to both subsets comprises means for detecting the fault in the worker path, and means for activating the plurality of detours by sending an activate message to the plurality of nodes of the further subset upon detection of the fault in the worker path.

Claim 94 : (New) The system according to claim 93, in which the plurality of nodes comprising means for sending the activate message also comprise means for sending the activate message to each adjacent node of the further subset.

Claim 95 : (New) The system according to claim 93, in which the activate message contains a unique path identifier to inform the plurality of nodes of the further subset which connections to activate.

Claim 96 : (New) The system according to claim 89, in which the plurality of nodes comprise means for detecting the location of the fault in the worker path and

means for, upon detection of the fault location, sending a deactivate message through the first-mentioned subset in a direction away from the fault.

Claim 97 : (New) The system according to claim 96, in which each node comprises means for detecting receipt of the deactivate message and, upon receipt of such a message, for deactivating any path passing from that node via the plurality of nodes of the further subset where those paths do not form a protection path to a faulty part of the worker path.

Claim 98 : (New) The system according to claim 89, comprising means for allocating the plurality of links and the plurality of nodes at least one cost value relative to the plurality of links and the plurality of nodes of the worker path, and means for selecting on the basis of the at least one cost value the further subset of the plurality of nodes and the plurality of links to form a protection path for at least one of the plurality of links and the plurality of nodes of the worker path.

Claim 99 : (New) The system according to claim 98, comprising means for selecting the subset that has the lowest cost value.

Claim 100 : (New) The system according to claim 99, comprising means for allocating the plurality of nodes and the plurality of links on the worker path other than the at least one of the plurality of nodes and the plurality of links to be protected a cost value lower than the cost value for the other of the plurality of nodes and the plurality of links.

Claim 101 : (New) The system according to claim 100, in which the lower cost value is zero.

Claim 102 : (New) The system according to claim 98, comprising means for allocating the at least one of the plurality of nodes and the plurality of links to be protected a cost value higher than the cost value for the other of the plurality of nodes and the plurality of links.

Claim 103 : (New) The system according to claim 98, in which a cost value for the at least one of the plurality of nodes and the plurality of links to be protected is set so that the at least one of the plurality of nodes and the plurality of links will not be selected.

Claim 104 : (New) The system according to claim 98, comprising further subsets of the plurality of nodes and the plurality of links for forming both a further worker path and a protection path for the further worker path.

Claim 105 : (New) The system according to claim 104, comprising means for allocating to at least one of a node and a link at least one intermediate cost value relative to each link and node of the worker path, provided that the at least one of the plurality of links and the plurality of nodes in the worker path and the plurality of links and the plurality of nodes in the further worker path protected by the at least one of the plurality of nodes and the plurality of links have no common point of failure.

Claim 106 : (New) The system according to claim 105, in which the intermediate value lies between the higher and lower values.

Claim 107 : (New) The system according to claim 106, comprising means for allocating to at least one of a node and a link at least one higher cost value relative to the at least one of the plurality of links and the plurality of nodes of the worker path so that the at least one of the plurality of nodes and the plurality of links will not be selected, and wherein the plurality

of links and the plurality of nodes in the worker path and the plurality of links or the plurality of nodes in the further worker path protected by the node or link have a common point of failure.

Claim 108 : (New) The system according to claim 98, including means for allocating the plurality of links and the plurality of nodes a cost value relative to each link and node of the worker path.

Claim 109 : (New) The system according to claim 98, in which the system comprises protection means for determining the protection path prior to the detection of the fault in the worker path.

Claim 110 : (New) The system according to claim 103, comprising means for allocating the plurality of links and the plurality of nodes a further cost value relative to a further worker path and for selecting on the basis of the further cost value the further subset of the plurality of nodes and plurality of links to form the protection path for at least one of the plurality of links and the plurality of nodes of the further worker path.

Claim 111 : (New) A method of protecting a worker path in a data communications system, comprising the steps of:

a) providing a plurality of nodes and a plurality of links for providing connections between the plurality of nodes;

b) passing worker data through a subset of the plurality of links and the plurality of nodes making up the worker path, and designating a further subset of the plurality of links and the plurality of nodes to form a protection path;

c) the protection path carrying no worker data in the absence of a fault in the worker path, the protection path comprising a plurality of disjoint detours, each detour

providing an alternative path for the worker data in a different part of the worker path in the event of a fault in the worker path;

d) detecting the fault in the worker path, and activating the entire plurality of detours to carry the worker data upon detection of a fault in the worker path; and

e) identifying a location of the fault, and returning the worker data to a part of the worker path not affected by the fault from at least one of the plurality of detours that are providing an alternative to that part of the worker path not affected by the fault, while those of the plurality of detours providing an alternative to parts of the worker path which are affected by the fault continue to carry the worker data.

Claim 112 : (New) The method according to claim 111, including the step of storing details of the plurality of detours in the plurality of nodes of the further subset prior to the detection of the fault in the worker path.

Claim 113 : (New) The method according to claim 112, including the step of associating the details of the protection path with a unique path identifier.

Claim 114 : (New) The method according to claim 112, in which each of the plurality of nodes of the further subset comprise a protection table for storing details of the protection path of which it forms a part.

Claim 115 : (New) The method according to claim 111, including the steps of at least one of the plurality of nodes common to both subsets detecting the fault in the worker path, and activating the plurality of detours by sending an activate message to the plurality of nodes of the further subset upon detection of the fault in the worker path.

Claim 116 : (New) The method according to claim 115, including the step of operating the plurality of nodes to send the activate message to each adjacent node of the further subset.

Claim 117 : (New) The method according to claim 115, including the step of including a unique path identifier in the activate message to inform the plurality of nodes of the further subset which connections to activate.

Claim 118 : (New) The method according to claim 111, including the steps of at least one node detecting a location of the fault in the worker path and, upon detection of the fault location, sending a deactivate message through the first-mentioned subset in a direction away from the fault.

Claim 119 : (New) The method according to claim 118, including the steps of the plurality of nodes detecting receipt of the deactivate message and, upon receipt of the deactivate message, deactivating any path passing from the node via the plurality of nodes of the further subset where those paths do not form a protection path to a faulty part of the worker path.

Claim 120 : (New) The method according to claim 111, including the steps of allocating the plurality of links and the plurality of nodes at least one cost value relative to the plurality of links and the plurality of nodes of the worker path, and selecting on the basis of the at least one cost value the further subset of the plurality of nodes and the plurality of links to form a protection path for at least one of the plurality of links and the plurality of nodes of the worker path.

Claim 121 : (New) The method according to claim 120, including the steps of selecting the subset that has the lowest cost value.

Claim 122 : (New) The method according to claim 120, including the steps of setting the at least one cost value for the plurality of nodes and the plurality of links on the worker path other than the at least one of the plurality of nodes and the plurality of links to be protected lower than the cost value for the other of the plurality of nodes and the plurality of links.

Claim 123 : (New) The method according to claim 122, in which the lower cost value is zero.

Claim 124 : (New) The method according to claim 120, including the steps of setting the at least one cost value for the at least one of the plurality of nodes and the plurality of links to be protected higher than the cost values for the other of the plurality of nodes and the plurality of links.

Claim 125 : (New) The method according to claim 120, including the steps of setting the at least one cost value for the at least one of the plurality of nodes and the plurality of links to be protected so that the at least one of the plurality of nodes and the plurality of links will not be selected.

Claim 126 : (New) The method according to claim 120, and comprising a further worker path for protection for the further worker path in the data communications system.

Claim 127 : (New) The method according to claim 126, including the steps of setting the at least one cost value relative to the worker path of one of a node and a link to an intermediate value, provided that the plurality of nodes and/or the plurality of links on the worker path and on the further worker path for protection by the one of the node and the link have no common point of failure.

Claim 128 : (New) The method according to claim 127, in which the intermediate value lies between the higher and lower values.

Claim 129 : (New) The method according to claim 128, including the steps of setting the at least one cost value relative to the worker path of one of a node and a link to a higher value so that the one of the node and the link will not be selected, if the plurality of nodes and/or the plurality of links on the worker path and on the further worker path for protection by the one of the node and the link have at least one common point of failure.

Claim 130 : (New) The method according to claim 120, including the step of allocating each link and node at least one cost value relative to each link and node of the worker path.

Claim 131 : (New) The method according to claim 130, including the step of determining the protection path prior to the detection of the fault in the worker path.

Claim 132 : (New) The method according to claim 131, including the steps of allocating the plurality of links and the plurality of nodes a further cost value relative to the further worker path, and selecting on the basis of the further cost value a further subset of the plurality of nodes and the plurality of links to form the protection path for at least one of the plurality of links and the plurality of nodes of the further worker path.